

pyloric cæca were densely matted together and entangled with parasitic worms; there were about nine cæca. Beside these the hepatic duct opened into the gut. Vertebrae 39 (15 abdominal and 24 caudal). Abdomen extends well behind the vent into the tail. The stomach is elongate, *cæcal* in shape, and empty; its inner surface presented large, coarse, longitudinal rugæ. Liver small.

Two strange Structures.

1. *An unobliterated yolk-sac* (?).—Lying free in the peritoneal cavity to the right of the stomach and extending from the liver anteriorly to near the vent was an elongate bladder with a shiny pearly external coating of peritoneum. Its posterior end was free and broad; its anterior end was narrow and formed a long neck which was distinctly traced up to the large vessels of the liver; from these vessels a large branch descended along the neck, and broke up into smaller branches in the bladder-wall.

2. *A rectal cæcum*.—From the region of the pyloric cæca there descended a cæcum which entered the anterior or ventral surface of the rectum about 2 mm. above the vent. In the posterior part of its course it was in intimate connexion with the ventral aspect of the rectum. Its anterior relations could not be ascertained with certainty, as during the unravelling of the pyloric cæca the anterior extremity of the cæcum got broken.

The colour in life was violet-black.

A single specimen, about $9\frac{1}{2}$ inches long, was caught in the trawl at Sta. 315, Bay of Bengal, near the Andamans, 705 fathoms. It has been figured and will appear in the next issue of the "Illustrations of the Zoology of the R.I.M.S. 'Investigator.'"

Named after Major Aleock, F.R.S., Superintendent of the Indian Museum, in gratitude for the guidance and help he has invariably given to the Surgeon-Naturalist.

XXIX.—*List of a small Collection of Odonata (Dragonflies) from Ceylon, collected by Mr. E. Ernest Green, with Notes on the Genus Zygonidia and its Allies, and Descriptions of new Species of Zygonidia, Kirb., and Onychothemis, Brauer, from Ceylon and Tonkin.* By W. F. KIRBY, F.L.S., F.E.S., &c.

I HAVE lately received, through Mr. W. J. Lucas, an assortment of dragonflies collected by Mr. E. Ernest Green, chiefly

at Kandy, in 1900 and 1901 ; and although there is but one new species among them, it seems worth while to give a complete list, because the specimens are all ticketed with dates and localities. A single ant-lion, not yet determined, but probably belonging to the genus *Creagris*, Hag., was among the dragonflies.

Libellulidæ.—LIBELLULINÆ.

1. *Tholymis tillarga*, Fabr.

Kandy, Dec. 1900. (2 specimens.)

2. *Pantala flavesceus*, Fabr.

Caught at light, Peradeniya, Oct. 11, 1900 ; also at Kandy and Yatigantata, Nov. 1900. (3 specimens.)

3. *Neurothemis tullia*, Dru.

Kandy, Nov. and Dec. 1900. (2 specimens.)

4. *Trithemis aurora*, Burm.

Peradeniya, June 1900 ; Kandy, Dec. 1900. (4 specimens.)

5. *Brachythemis contaminata*, Fabr.

Kandy, Dec. 1900. (18 specimens.)

6. *Macrodiplax vittata*, Kirb.

Ramisaram Island, S. India. (1 specimen.)

7. *Zygonidia ceylonica*, Kirb., sp. n. (*infra*).

Kandy, Feb. 1901.

8. *Orthetrum sabina*, Dru.

Peradeniya, June 1900 ; Kandy, Nov. and Dec. 1900. (4 specimens.)

9. *Orthetrum pruinolum*, Burm.

Kandy, Nov. and Dec. 1900. (4 specimens.)

10. *Diplacodes trivialis*, Ramb.

Kandy, Nov. 1900 ; Peradeniya and Jaffera, March 1901. (4 specimens.)

11. *Acisoma panorpoides*, Ramb.

Kandy, 1900. (1 specimen.)

Agrionidæ.—*AGRIONINÆ*.12. *Neurobasis chinensis*, Linn.

Hangam, Nov. 1900; Kandy, Feb. 1901. (4 specimens.)

13. *Vestalis apicalis*, Selys.

Matale, March 1900; Kandy, Nov. and Dec. 1900. (13 specimens.)

14. *Micromerus finalis*, Selys.

Kandy, Nov. 1900. (2 specimens.)

Agrionidæ.—*CÆNAGRIONINÆ*.15. *Platysticta tropica*, Selys.

(Kandy?), Nov. 1900. (1 specimen.)

16. *Disparoneura cæsia*, Selys.

Kandy, Nov. and Dec. 1900. (5 specimens.)

17. *Micronympha senegalensis*, Ramb.

Ramisaram Island, S. India. (1 specimen.)

18. *Micronympha aurora*, Brauer.

Kandy, Dec. 1900. (1 specimen.)

19. *Archibasis ceylonica*, Kirb.

Jaffera, March 1901. (2 specimens.)

Notes on the Genus Zygonidia, Kirb., and its Allies.

Since I founded this genus (Ann. & Mag. Nat. Hist. (7) v. pp. 533, 540, 1900) for *Zygonidia insignis*, Kirb., from Hainan, several additional notes have been published. Mr. Laidlaw has described another species from Malacca, and the Natural History Museum has received four specimens from Tonkin and Ceylon, referable to undescribed species.

Krüger has discussed *Zygonyx* (*Neurocera*) *ida*, Selys, and considers *Zygonyx ida* and *Z. iris* too close to form more than separate sections in one genus (Stett. ent. Zeit. lxiii. pp. 110–113, 1902).

In *Pseudomacromia torrida*, Kirb., the front ridge of the middle and hind femora is armed with numerous short spines,

directed towards the knee, and becoming rather longer towards the extremity of the femora, where they are followed by three or four long setæ. The front carina of the front femora and the hind carina of the hind femora are also armed with extremely fine teeth.

The genus *Pseudomacromia* must therefore be placed in the immediate neighbourhood of *Zygonidia*, though the claws are not bifid, but dentated *.

I add here a list of the described species of *Zygonidia*, with descriptions of new species from Ceylon and Tonkin.

Genus ZYGONIDIA, Kirb.

Zygonidia, Kirb. Ann. & Mag. Nat. Hist. (7) v. pp. 532, 540 (June 1900).

1. *Zygonidia insignis*, Kirb.

Zygonidia insignis, Kirb. l. c. pp. 533, 540, pl. xii. fig. 1 (June 1900).

Hab. Hainan.

2. *Zygonidia malayana*, Laidlaw.

Zygonidia malayana, Laidlaw, Proc. Zool. Soc. Lond. 1902, i. pp. 73-75, fig. 11 (femur).

Hab. Kwala Aring, Malay Peninsula.

3. *Zygonidia ceylonica*, Kirb., sp. n.

♂.—Long. corp. 57 mm.; exp. al. ant. 102 mm., lat. 9 mm., long. pter. $2\frac{1}{2}$ mm.; lat. al. post. 14 mm., long. pter. 3 mm.

♀.—Long. corp. 55 mm.; exp. al. ant. 105 mm., lat. 11 mm., long. pter. 3 mm.; lat. al. post. 16 mm., long. pter. 3 mm.

Male.—Head: upper part rich purple, sides of frons and genæ yellow; the rest of the face dull bluish black, except the mentum, which is shining black, bordered on the sides and front with yellow. Occiput black. Thorax and abdomen black above, with three yellowish spots on the median line between the wings; a strong carina, narrowly lined with yellowish, on segments 2-8 of the abdomen. Pleura greenish blue, with broad yellow sutures; first two abdominal segments with a small yellow spot on each side. Legs blackish; femora with numerous short spines directed towards

* Cf. Sjöstedt, Bihang Svenska Akad. xxv. (4: 2) pp. 23-26 (1900).

the knee, probably followed in perfect specimens by 3 or 4 long cilia.

Abdomen slightly dilated at base; terminal appendages about as long as the eighth segment, which is shorter than the seventh, which again is shorter than the sixth. Upper appendages of usual form, waved and pointed; lower one nearly as long, broad at base, with the narrowed extremity turned upward; below the basal half is a large oval excrescence, preceded by a tubercle on the under surface of the eighth segment.

Wings clear hyaline; pterostigmata, as in all the genus, dark brown; front wings with 16 antenodal cross-nervures, the last discontinuous on the left-hand side, and 9-11 postnodals in the upper space, the postnodals rarely coinciding with those in the lower; cells beyond the pterostigma single; nodal sector undulating, arched strongly downwards at the extremity; a single row of cells between the nodal and subnodal sectors, except close to the margin; two cross-nervures in the lower basal cell; triangle with one cross-nervure above the middle, and followed by three rows of cells, increasing towards the margin; subtriangular space consisting of 3 cells; upper sector of the triangle rising from its apex, the lower rising considerably beneath it.

Hind wings with 11 antenodals and 11 postnodals; 1 nervure in the lower basal cell; base of triangle distinctly nearer the base of the wing than the arculus, and its point not extending to the level of the triangle of the fore wings. Triangle traversed, followed by one row of 3 cells and one or two rows of 2 increasing; sectors of the triangle rising from a point.

All the wings rather pointed, owing to their rapid contraction beyond the point where the sectors of the arculus reach the margin. Membranule small, especially on the fore wings, greyish brown, whitish towards the base.

Female.—Head: metallic green above; face and mentum as in the male, but more broadly and brightly yellow on the sides, and no yellow in front of the mentum. Eyes brown above, broadly reddish in front and at the sides, which is only faintly visible in the male.

Thorax and abdomen black above, with 3 yellow median spots between the wings, and a slender yellow line on the carina from the second to the seventh segment of the abdomen. Pleura with 3 broad yellow bands, separated by 2 green ones; first and second segments of abdomen with the transverse carinæ yellow, a large yellow trapezoidal lateral

spot on the first and a long one on the second. Denticulation of femora rather finer than in the male.

Wings of a slightly yellowish hyaline; front wings with 16 antenodal nervures on the right side, the last discontinuous; 15 continuous ones on the left side; 11 postnodals on the right side in the upper space and 10 on the left; membranule whitish, very narrow; otherwise as in the male. Hind wings with 11 antenodals and 10 or 11 postnodals; otherwise as in the male.

Hab. Kandy, Feb. 1901 (*E. E. Green*). Two specimens, ♂ and ♀.

Distinct from all the other species before me by the comparatively short pterostigma.

4. *Zygonidia ænea*, Kirb., sp. n.

♂.—Long. corp. 54 mm.; exp. al. ant. 97 mm., lat. 10 mm., long. pter. 4 mm.; lat. al. post. 12 mm., long. pter. $3\frac{1}{4}$ mm.

♀.—Long. corp. 57 mm.; exp. al. ant. 110 mm., lat. 11 mm., long. pter. 5 mm.; lat. al. post. 15 mm., long. pter. $4\frac{1}{2}$ mm.

Male.—Head purple above; frontal ocellus very conspicuous, yellow; face black, with a slight greenish tinge; the genæ, the lower border of the frons, and the rhinarium yellowish; mentum broadly bordered with yellow at the sides.

Thorax brown above, dull yellowish on the sides, with two broad bronzy-green bands in front above and two on the pleura on each side. Abdomen bronzy black above, 3 interalary spots on thorax, and narrow yellow lines on abdominal carinæ, as in *Z. ceylonica*. Base of abdomen slightly inflated, dull yellow on the sides as far as the base of the fourth segment, crossed by broad black lines at the end of each segment, and a narrower one on the carina of the second segment. Legs black, the femoral denticulation very fine.

Wings of a slightly yellowish hyaline, and very slightly clouded at the tips; front wings with 16 antenodal cross-nervures, the last discontinuous, the fifth on the right-hand side V-shaped, and 9 or 10 postnodals; the postnodals in the upper space rarely corresponding with those in the lower; cells beyond the pterostigma single; nodal sector undulating, arched strongly downward at the extremity; a single row of cells between the nodal and subnodal sectors, except irregularly towards the margin; two cross-nervures in the lower

basal cell, triangle with a cross-nervure just above the middle, and followed by three rows of cells, only increasing towards the margin, subtriangular space consisting of 3 cells; upper sector of the triangle rising from its extremity, the latter separated, and rising considerably below.

Hind wings with 11-12 antenodal and 10-11 postnodal cross-nervures; *two* cross-nervures in the lower basal cell; triangle with 1 or 2 cross-nervures, its base somewhat nearer the base of the wing than the arculus, and its apex not extending to the level of the triangle of the front wings. Triangle followed by one row of 3 cells, and several rows of 2 increasing; sectors rising from a point.

Membranules smoky grey, that of the hind wings followed by a smoky shade over the cells which immediately border it.

Female.—Upper part of the head bronzy green, with the conspicuous yellow frontal ocellus; face from the lower part of the frons to the rhinarium inclusive yellow, except for very narrow black sutures; below this to the mentum bronzy black, except a yellow spot at the base of the mandibles; mentum black in the middle, with the sides broadly yellow. Thorax and pleura nearly as in the male, but the pleura brighter yellow, and marked with 3 black depressed spots: 2 higher ones just in front of each of the metallic-green bands, and 1 lower one a little behind the first pleural green band. Interalary spots dark yellow, much larger than in the male, and a much broader stripe of the same colour, expanded on the front segments, running over the carina of the abdomen to the end of the seventh segment; the slightly inflated basal segments are mostly of the same colour, which is continued by a row of long lateral spots, gradually shortening, as far as the seventh segment. Legs bronzy black, femora finely denticulated, and with terminal setæ; front femora pale beneath.

Wings rather deeper-coloured than in the male, and more clouded towards the tips. Fore wings with 16-17 antenodal cross-nervures, the last discontinuous, and 10-11 postnodals. Nodal sector more arched towards the extremity than in the male, the space between the nodal and subnodal sectors thus widening considerably just before the extremity, where it again contracts. Triangle crossed by one or two cross-nervures; lower basal cell with two cross-nervures; membranule small, brown; other characters as in the male.

Hind wings with 11 antenodal and 11 or 12 postnodal nervures. One cross-nervure only in the lower basal cell; triangle traversed by 1 nervure; membranule brown, as are

also the immediately adjacent cells ; other characters as in the male.

Hab. Tonkin (*Eruhstorfer*).

Allied to *Z. insignis*, of which the female is unknown. The male is very distinct from any other described species of *Zygonidia* by possessing two cross-nervures in the lower basal cell of the hind wings. The female has but one, as usual.

Genus NEUROCENA, Kirb.

Neurocena, Kirb. Ann. & Mag. Nat. Hist. (7) v. p. 541 (1990).

Neurocena ida, Hagen.

Zygonyx ida, Hagen & De Selys, &c. (*cf.* Kirb. *l. c.*).

Neurocena ida, Kirb. *l. c.* ; Laidlaw, Proc. Zool. Soc. Lond. 1902, i. p. 72, pl. v. fig. 1.

Another specimen (♂) from Province Wellesley is now in the Natural History Museum.

Genus ONYCHOTHEMIS, Brauer.

Onychothemis, Brauer, Verh. zool.-bot. Ges. Wien, xviii. pp. 170, 365, 732 (1868) ; Kirb. Trans. Zool. Soc. Lond. xii. pp. 258, 284 (1889).

Two species only have been described in this remarkable genus :—*O. abnormis*, Brauer (*ll. cc.*), from the Philippines, and *O. testacea*, Laidlaw (P. Z. S. 1902, i. pp. 75, 76, fig. 12 (leg), and pl. v. fig. 2), from Malacca. *Libellula hova*, Ramb., from Madagascar, doubtfully referred to *Onychothemis* by Brauer and Kirby, is now referred by Karsch and Calvert to *Pseudomacromia*, Karsch (*nec* Kirb.).

I have just discovered a specimen of a third and extremely handsome species in the Natural History Museum which resembles *Zygonidia* in neurulation (last antenodal discontinuous, triangle of the fore wings placed beyond the level of that of the hind wings, base of triangle of hind wings nearer the base of wings than the arculus), but differs from it entirely by the great spines on the femora and tibiae and the simple claws. There is no carina on the fourth segment.

Onychothemis notabilis, Kirb., sp. n.

Long. corp. 54 mm. ; exp. al. ant. 100 mm., lat. 11 mm., long. pter. $4\frac{1}{2}$ mm. ; lat. al. post. 13 mm., long. pter. 4 mm.

Female.—Head metallic green above, with the ocelli conspicuously yellow ; face black, lower border of frons, upper border of nasus, and rhinarium dull yellow, also genæ and

base of mandibles; mentum black, sides yellow; occiput black, occipital triangle and two spots behind each eye yellow; a yellow transverse band on back of collar; thorax and abdomen black, thorax with a conspicuous median line; pleura greenish bronzy, with three rather narrow oblique yellow stripes, the first shortest and followed below by a curved yellow stripe above the middle coxæ; interalary spaces spotted with yellow; abdomen very slightly inflated at base, with no longitudinal line above, but with a yellow spot in front of the second segment, the sutures from the second to the fifth segments and the carina of the third segment narrowly yellow; a row of large lateral spots, divided by the carinæ, from the third to the seventh segments, a small one below the carina on the eighth, and an additional spot, bisected by a dark line, on each side of the median carina on segments 6 and 7. Legs black; front femora denticulated beneath, and with 1 long spine towards the extremity on the inner side; tibiæ setose beneath, with 5 long spines diminishing in length on the outer side, and 2 or 3 shorter ones on the inner; middle and hind femora with rows of spines, increasing in length towards the extremity and longest on the hind femora; middle tibiæ with 4 and hind tibiæ with 5 pairs of long oblique spines, not quite symmetrical. Claws large, curved, not toothed or bifid.

Wings yellowish hyaline, slightly smoky at the tips, neuration black; pterostigma very dark reddish brown; front wings with 16 or 17 antenodal cross-nervures, the last not continuous, and 10-11 postnodal cross-nervures; nodal sector much waved, one row of cells between the nodal and subnodal sectors, increasing towards the margin; sectors of the arculus rising at two thirds of its length; one cross-nervure in the lower basal cell; triangle traversed slightly above the middle, placed beyond the level of that of the hind wings, regular, and followed by 3 rows of post-triangular cells; subtriangular space consisting of 3 cells. Membranule of moderate size, grey, as also on the hind wings.

Hind wings with 10 antenodal and 11-12 postnodal cross-nervures; triangle open (the base placed nearer the base of the wing than the arculus), followed by one row of 3 cells and then by rows of 2 or 3 increasing; sectors of the triangle rising in a point at its lower angle.

Hub. Tonkin (*Fruhstorfer*).

A single female specimen of this handsome species.